

STATE OF ALASKA

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Annual Performance Report for

INVENTORY AND CATALOGING OF
THE SPORT FISH AND SPORT FISH
WATERS IN THE UPPER COOK INLET

by

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Job No. G-I-D Inventory and Cataloging of the Sport
Fish and Sport Fish Waters in the
Upper Cook Inlet
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RESEARCH PROJECT SEGMENT

State: Alaska Name: Sport Fish Investigations of Alaska

Project No.: F-9-11

Study No.: G-I Study Title: INVENTORY & CATALOGING

Job No.: G-I-D Job Title: Inventory and Cataloging of the Sport Fish and Sport Fish Waters in the Upper Cook Inlet

Period Covered: July 1, 1978 to June 30, 1979

ABSTRACT

Minnow trapping conducted in Willow Creek to determine migrational patterns of juvenile chinook salmon, *Oncorhynchus tshawytscha* (Walbaum), showed chinook densities rapidly declined in January and February. Chinook juveniles are believed to have migrated into the Susitna River as rearing habitat decreased in Willow Creek during low winter flows.

A creel census conducted in June on nine lakes in the Kepler Lake Complex revealed an average rainbow trout, *Salmo gairdneri* Richardson, catch rate of 0.11 trout per hour. Anglers fished an average of 2.77 hours per day and the average catch rate on weekends was .09 fish per hour while the mean weekday catch rate was 0.14 fish per hour.

Chinook salmon populations in Matanuska-Susitna Valley streams were estimated at 15,365 which was 23% lower than the record 1976 escapement.

Coho salmon, *O kisutch* (Walbaum), escapement counts conducted in established index areas revealed above average numbers in most streams.

BACKGROUND

To evaluate and develop plans for enhancement of anadromous fish stocks requires basic life history investigations of all species residing in a system. Such studies were conducted on salmonids in Fish and Meadow creeks in 1976 and 1977.

Willow Creek has been designated by the Department of Fish and Game as a potential site for salmon enhancement. No formal programs have been designed to conduct life history investigations of salmonids in the Willow Creek drainage. To obtain an initial understanding of salmonids in Willow Creek, a limited sampling program was initiated in August 1977 and continued through April 1978. The outcome of the sampling was not

reported on in the 1977-78 Annual Report of Performance since this report was written prior to the end of the sampling program. It was intended to repeat this program to verify the results, but when sampling was conducted in August and October of 1978, so few fish were present that no further sampling was attempted. Results of the two years of sampling are presented in this report.

Chinook and coho salmon are two of the most valued sport fishes in the Upper Cook Inlet area. There have been numerous conflicts between sport and commercial users over allocation of these two species.

Chinook salmon numbers in Cook Inlet declined to extremely low levels in the 1960's and have been managed intensively to restore runs to historic levels. Upper Cook Inlet chinook salmon have been protected by complete closures on both sport and commercial fisheries since 1973. Prior to 1973, limited sport and commercial openings were allowed in some areas.

Coho salmon runs in recent years have been declining in Upper Cook Inlet streams. Because of the timing of coho runs through the commercial fishery, it is difficult to effectively manage coho salmon.

Escapement counts have been conducted on various streams in the Matanuska-Susitna valleys since 1969 to evaluate the effectiveness of various chinook and coho salmon management programs. Chinook carcass data collected from several streams reveal the age structures of these fish which aids in evaluating returns from parent escapements.

One objective of this study was to assess chinook salmon harvest levels and fishing effort, but since the chinook salmon fishery in Upper Cook Inlet did not take place in 1978 as scheduled, the monitoring program was cancelled.

A creel census was conducted from April 30 through September 5, 1977 on nine lakes located near Palmer (Watsjold, 1978). All nine lakes had been rehabilitated and were being stocked on a regular basis with various species. The creel census was conducted to determine the return to the creel of stocked fish which would provide a means of determining the success of the stocking program in the Matanuska-Susitna Valley.

A limited creel census was conducted on the same nine lakes from June 7 through July 1, 1978. The creel census was designed to obtain maximum angler contacts during a short period of time. The census and resulting information was used to verify 1977 creel census results.

Table 1 lists all species mentioned in this report and Figure 1 is a map of the study area.

RECOMMENDATIONS

1. Life history investigations of chinook and coho salmon should be continued on tributaries of the Susitna River.

Table 1. List of common names, scientific names and abbreviations.

Common Name	Scientific Name and Author	Abbreviation
Chinook salmon	<i>Oncorhynchus tshawytscha</i> (Walbaum)	KS
Coho salmon	<i>Oncorhynchus kisutch</i> (Walbaum)	SS
Arctic grayling	<i>Thymallus arcticus</i> (Pallas)	GR
Rainbow trout	<i>Salmo gairdneri</i> Richardson	RT
Threespine stickleback	<i>Gasterosteus aculeatus</i> (Linnaeus)	TST

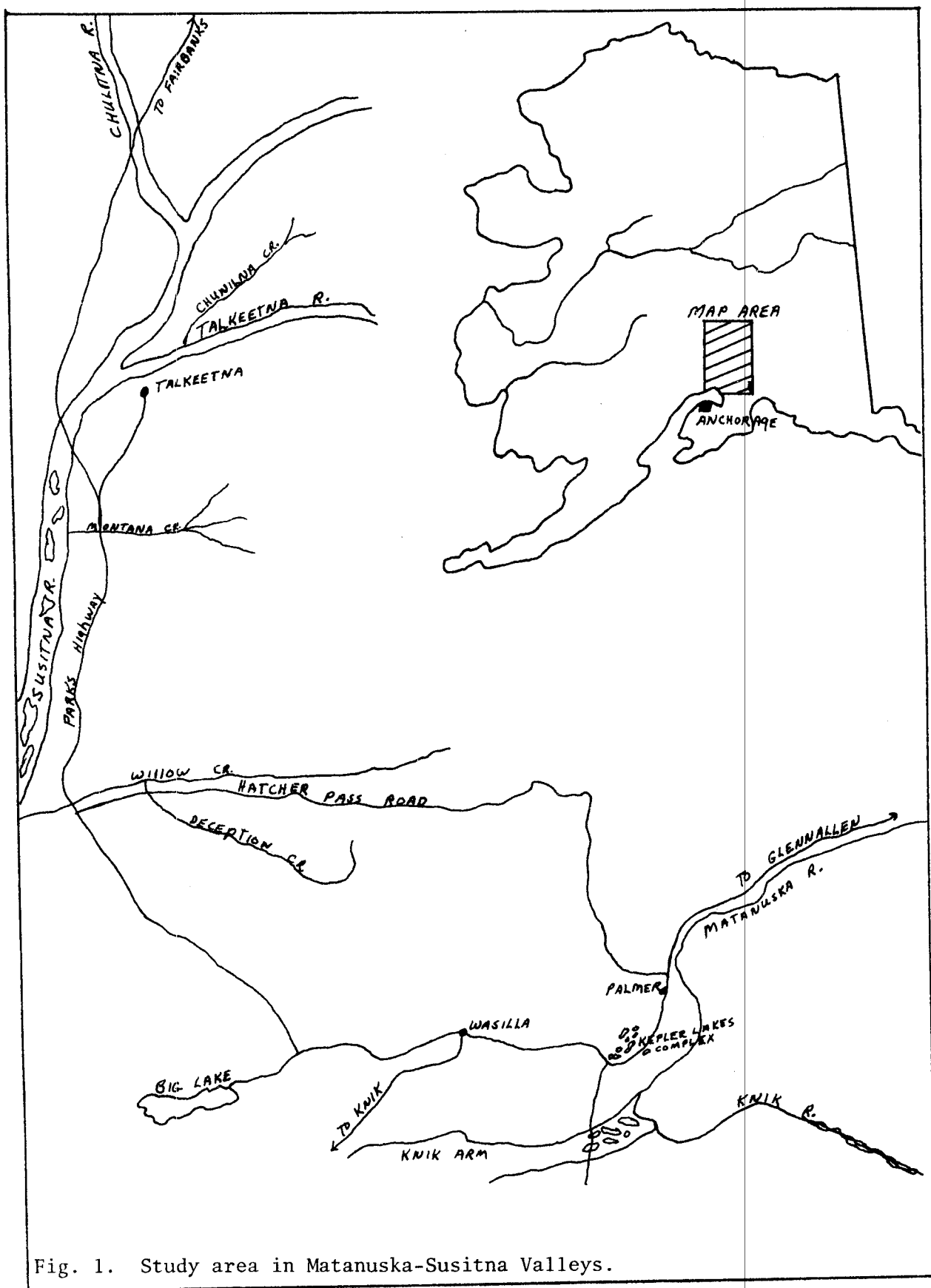


Fig. 1. Study area in Matanuska-Susitna Valleys.

- a. Minnow trapping should be conducted on a regular basis in the Willow Creek drainage to determine relative fry abundance and migrational movements.
 - b. Minnow trapping should be conducted as time permits on other tributaries of the Susitna River to determine relative fry abundance and migrational movements.
 - c. It should be determined if abundance of salmon fry as measured by minnow trapping can be related to spawning densities.
2. Monitoring coho and chinook salmon escapements in selected streams of the area should be continued to evaluate current management practices.
3. Surveys should be conducted on lakes not previously surveyed and on lakes that have not been recently surveyed, as time permits, to provide useful data for lake management programs.
4. Monitoring of flows and temperatures in selected streams in the Matanuska-Susitna Valley should be continued to obtain baseline data which will be useful in determining the effect of low water years on coho salmon production.
5. Harvest and fishing effort should be determined on those streams open to chinook salmon fishing.

OBJECTIVES

1. To determine and record the environmental characteristics of existing and potential fishery waters of the job area.
2. To investigate, evaluate and develop plans for the enhancement of anadromous and resident fish stocks.
3. To determine chinook harvest levels and fishing effort on those streams open to chinook salmon fishing.
4. To make recommendations for the proper management of various sport fish waters in the area and to direct future studies.

TECHNIQUES USED

Minnow trapping was conducted on Willow Creek utilizing 6 mm wire mesh minnow traps baited with salmon roe. The creek was divided into index areas and the same number of traps set in each index area during every sampling period. The time between sampling periods varied depending on time available to complete sampling in all index areas over a period of several days. Sampling was normally conducted every 1 1/2 months. A fifty fish sample

was collected from the same index area during each sampling period to determine growth rates.

Monofilament gill nets 1.8 m x 38 m (6 ft x 125 ft) having five mesh sizes ranging from 12 to 50 mm (1/2 in to 2 in) bar measure were used to collect fish specimens. Nets were normally set for 24 hours in each lake.

Fork lengths of adult salmon were recorded to the nearest 0.1 cm while fork lengths for juvenile salmon and resident species were recorded to the nearest millimeter and weights to the nearest gram.

Creel census of the Kepler Lakes Complex was not statistically designed to estimate harvest and effort on the nine lakes involved. Weekend days were divided into three 4-hour periods, between the hours of 10 a.m. and 10 p.m. The census taker traveled to four access points throughout the census day, remaining at each one until all anglers were checked. On the weekday there was only one sample period from 5 p.m. to 9 p.m. The census taker sampled on three weekdays each week, again traveling to all four access points during the census period. The weekdays sampled were determined by the census taker. If it was raining or there were high winds during a weekday evening, the census was inactive.

Chinook spawning populations were enumerated by boat, aerial (fixed wing and helicopter) and streambank surveys; while coho spawning populations were enumerated by foot surveys within established index areas. Chinook carcass data were collected and age classes were determined by length frequencies.

FINDINGS

Willow Creek Fisheries Investigation

Minnow trapping was conducted within three index areas on Willow Creek below the canyon area during August 1977. The canyon, which is a velocity barrier to salmon passage, is located approximately 15 miles upstream from the confluence of Willow Creek and the Susitna River. Trapping was continued on a regular basis through April 15, 1978. Catches consisted almost totally of juvenile chinook salmon. The primary objective of the trapping was to determine when juvenile chinook leave Willow Creek and enter the Susitna River. The juveniles captured were offspring of the 1976 chinook escapement of 1,660 adults which was the highest recorded escapement. Catch rates by index area are shown in Table 2. Index 1 is the most upstream area sampled while Index 3 is on the lower end of Willow Creek. The goal was to set 15 traps in Index 1 and 3 and 10 traps in Index 2. When winter conditions were severe it was not always possible to set all 15 traps in the upper and lower areas; however, there was never a period when less than 10 traps were set in any of the index areas. The December 1 sampling period was the first period when Willow Creek was iced over. The first notable decline in catch rates occurred on December 1 in Index 1 when the catch rate decreased to 27.5 fish/trap, which was substantially below the October 26 catch of 62.0 fish/trap.

Table 2. Results of Minnow Trapping for Chinook Salmon in Willow Creek, 1977-1978.

Date	Catch/Trap*					Average
	Index 0	Index 1	Index 2	Index 3	Index 4	
1977 Emergents						
August 23	. . .	68.7	84.3	98.0	. . .	83.3
October 26	. . .	62.0	84.2	104.1	. . .	83.3
December 1	. . .	27.5	75.8	104.8	. . .	68.6
January 18	. . .	34.5	29.7	32.7	. . .	32.4
March 2	. . .	30.2	6.3	15.2	. . .	17.4
April 15	. . .	11.3	5.4	1.7	. . .	6.0
1978 Emergents						
August 24	1.8	0.5	3.0	6.1	. . .	3.0
October 2	2.0	0.7	0.6	6.1	1.3	2.5

* Traps were always set for 24-hour periods and the same number of traps were used during each sampling period.

The average catch/trap for all index areas combined can be used to determine the general migrational pattern of juvenile chinook out of Willow Creek. During the August and October samplings, catch rates for all index areas averaged 83.3 chinook/trap. On December 1 the catch rate declined to 68.6 chinook/trap, and on January 18 catch rates had drastically dropped to 32.4 chinook/trap. By March very few chinook salmon remained in Willow Creek. It appears that the majority of chinook fry migrated out of Willow Creek during the January-February period. Montana Creek was also sampled periodically from August 1977 through February 1978. Chinook fry densities also declined in January and February according to Wadman, "pers. comm."

The reduction in population density is attributed to the extremely low water conditions encountered during the winter months which greatly reduced the rearing habitat. As the rearing area declines it is believed that juveniles migrate downstream into the Susitna River where greater flow and, presumably, better winter habitat is available.

Trapping was again initiated in August 1978 for chinook juveniles originating from the 1977 adult escapement of 1,065. Two additional index areas were established. Index 0 was immediately below the canyon area and Index 4 was at the mouth of Willow Creek. The average catch rate in August was three chinook/trap and in October it was 2.5 chinook/trap. Foot surveys were conducted to determine general fry abundance in Willow Creek. These surveys confirmed that very few fry were present. Two tributaries of Willow Creek also were minnow trapped in August and October; one tributary had a catch rate of 40 chinook/hour while the other had catch rates varying from 15 to 61 chinook/hour depending on the area. It is unknown why tributary streams had high chinook fry densities and Willow Creek itself had so few.

A sample of 50 chinook was collected during each sample period from Index 2 in 1977 and 1978. On August 25 and October 26, 1977, Age 0+ chinook salmon averaged 53 mm and 60 mm (2 in and 2.4 in) in length, respectively. On August 25, and October 3, 1978, Age 0+ chinook salmon averaged 75 mm and 81 mm (3 in and 3.2 in) in length, respectively. This large size disparity is probably due to a density factor since 1977 fry density was high and in 1978 fry density was extremely low.

It is apparent that much more sampling has to be conducted to determine life histories of chinook salmon in east side Susitna River tributaries.

Kepler Lakes Area Creel Census

A creel census was conducted from June 7 through July 1, 1978 on Echo, Matanuska, Kepler, Bradley, Long, Victor, Irene, Harriet and Canoe lakes.

During the census period 541 anglers were contacted and 152 angler-caught fish were recorded. These contacts included fishermen who had not completed fishing. Table 3 shows sport fish harvest and effort for the nine stocked lakes. For the seven rainbow trout lakes, catches

Table 3. Kepler Lakes Area Sport Fish Harvest and Effort*, June 7, 1978 to July 1, 1978.

Lake	Angler Day	Angler Hours	Observed Harvest	Angler Hrs./ Angler Day	Harvest/ Hour
Echo	200	623	63 RT	3.12	0.10
Matanuska	115	232	10 RT	2.02	.04
Kepler	69	149	6 RT	2.16	.04
Bradley	27	48	0	1.78	0
Long	80	305	67 RT	3.81	0.22
Victor	24	78	0	3.25	0
Irene	2	2	0	1.00	0
Harriet	22	57	6 GR	2.59	0.11
Canoe	2	4	0	2.00	0
TOTAL	541	1,498	152**	2.77	0.10

* These data include all weekend and weekday completed and incompletd angler trips.

** Comprised of 146 rainbow trout and 6 Arctic grayling.

ranged from no fish in Bradley, Irene and Canoe lakes to 0.22 trout/hour in Long Lake. The average rainbow trout catch rate for the seven lakes was 0.11 trout/hour which is similar to the 1977 seasonal trout catch rate of 0.13 per hour. Victor Lake is the only lake containing coho, and no fish were caught since it was not stocked in 1977 and few fish remained from the 1976 plant. Harriet Lake grayling catch rates were 0.11 per hour compared to the 1977 rate of 0.14/hour.

Echo, Matanuska, Kepler and Long lakes were the most popular with 87% of the effort occurring on these four lakes.

The creel census in 1977 was conducted from 6 a.m. to 10 p.m. It was found that only 3% of the anglers fished during the 6 a.m. to 10 p.m. period; therefore, in 1978 sampling was conducted between 10 a.m. and 10 p.m. In 1978, 77% of the effort during weekends occurred between the hours of 2 p.m. and 10 p.m. This compares to the 1977 findings that 76% of the effort occurred between the same hours.

Anglers fishing in 1978 averaged 2.92 hours per day on the weekend compared to 2.41 hours per day on weekdays, which when combined gives an average of 2.77 hours per day. In 1977, during the same period, anglers averaged 2.91 hours per day. Catch rates in 1978 on weekends were .09 fish per hour while weekday catch rates were 0.14 fish per hour. In 1977 catch rates were higher on weekends when 0.20 fish per hour was recorded. The 1977 weekday catch rate was 0.11 per hour.

Lake Stocking Evaluations

Ten stocked lakes were sampled through the ice with variable mesh gill nets in 1978-79 (Table 4). All but one lake contained landlocked coho salmon. Gill net catches were low in most of the lakes which may have been partially due to the later than normal sampling. Gill-netting is usually completed in November and December, but due to other commitments sampling did not commence until the end of December when dissolved oxygen levels were low and fish were probably more dormant than earlier in the winter.

Although sample sizes were small, most Age 0+ coho averaged about 110 mm in length after 6 to 7 months residency in a lake. The only exception was Memory Lake where Age 0+ coho were 154 mm in length. The high growth rate in Memory Lake is probably due to a reduction of fish numbers that have occurred during the previous two years when substantial winter kills were recorded.

Lucille Lake, which is one of the most productive lakes in the Matanuska Valley, continues to produce slow growing coho primarily due to large numbers of threespine stickleback. Age 1+ coho averaged only 156 mm in length in 1978 which is a considerably slower growth rate than in 1976 when Age 1+ coho averaged over 300 mm in length.

Table 4. Gill Net Results and Stocking Histories of Managed Lakes, Matanuska-Susitna Valleys, 1978-1979.

Lake	Date Sampled	Species	Age Class	n	Length (mm)			Catch/ Net Hr.	Date Stocked	Total Number	Per Lb.	Per Acre
					\bar{x}	\pm SD	Range					
Benka	1/19/79	SS	0+	3	111	1.73	110-113	.07	7/10/78	17,250	188	150
		SS	II+	6	232	17.12	216-263	0.13	5/28/76	23,000	341	200
Christiansen	1/19/79	SS	0+	3	109	8.74	102-119	.07	7/10/78	17,900	188	100
		SS	II+	8	306	8.57	292-322	0.17	5/28/76	26,900	341	150
Finger	12/28/78	SS	0+	3	107	5.69	102-113	.07	5/23/78	72,527	627	200
		SS	I+	8	190	33.96	159-256	0.20	5/17/77	72,500	698	200
		SS	II+	3	390	10.50	380-401	.07	5/28/76	72,500	341	200
Loon	1/19/79	SS	I+	22	224	15.71	193-258	0.46	6/8/77	10,800	623	100
Lucille	12/27/78	SS	0+	22	111	5.64	103-125	0.51	5/23/78	72,527	627	200
		SS	I+	11	156	18.90	142-207	0.26	5/17/77	72,500	512	200
Memory	12/28/78	SS	0+	19	154	13.61	117-177	0.41	7/11/78	12,500	277	150
		SS	II+	20	333	15.73	306-374	0.63	6/1/76	16,600	298	200
Prator	1/19/79	SS	0+	4	110	2.16	108-113	.09	7/11/78	9,800	277	100
		SS	II+	29	248	43.01	184-332	0.63	6/1/76	9,800	298	100
Rocky	1/5/79	SS	0+	20	113	4.41	108-124	0.42	7/11/78	8,900	277	150
		SS	I+	40	177	13.00	164-229	0.84	6/8/77	11,800	623	200
Seymour	1/5/79	RT	I+	22	393	23.94	345-444	0.45	5/27/77	46,000	197	200
Victor	12/27/78	SS	0+	1	145			.02	7/11/78	2,800	277	200

Chinook Salmon Studies

Chinook salmon escapement surveys on east side Susitna River tributaries and tributaries of the Talkeetna and Chulitna rivers were conducted from July 17 to July 27, 1978. Discharges were slightly higher than normal but the water remained clear in most streams. A total of 12,853 chinook salmon were observed during escapement surveys. Watsjold (1974) found that during aerial surveys, chinook were observed in alpine streams with 70% efficiency and were observed in streams flowing through heavily forested areas with 55% efficiency. Based on these findings, as well as foot counts, it was estimated the 1978 chinook escapement was 15,365. This is somewhat lower than the 1976 and 1977 record escapements of 19,900 and 17,028 chinook, respectively (Table 5).

Five streams had record escapements; the most notable is Sheep Creek with 1,209 chinook which is almost double the previous high of 630 observed in 1977 (Table 6). Stream conditions on Willow and Montana creeks were not considered optimal when the counts took place. Willow Creek water levels were higher than normal and overcast skies made visibility difficult in some areas. Montana Creek was not only higher than normal, but water clarity was not good, and it was felt that the count was much lower than the actual escapement. In past years, chinook salmon in Deception Creek have been counted from its intersection with 4-Mile Road downstream to its confluence with Willow Creek. This count has always been included with the Willow Creek count. In 1978, surveys were completed above the 4-Mile Road intersection of Deception Creek and 495 chinook were observed. An aerial flight revealed that numerous chinook spawned above the point where the survey ended. It is felt the total escapement was near 800 chinook, and that Deception Creek is an important chinook spawning stream despite its small size. Counts will be conducted on the additional area in future years.

Chinook carcasses were collected from Montana Creek, Chulitna River, Willow Creek and Deception Creek. Length and age data collected from carcasses are shown in Tables 7, 8, 9 and 10.

In Montana Creek 174 chinook carcasses had a mean length and standard deviation of 98.6 \pm 18.35 cm. Males and females averaged 95.0 and 103.3 cm in length, respectively, and the male to female sex ratio was 1.3:1. Age composition indicated 16.7% Age 1.2, 18.4% Age 1.3 and 64.9% were Age 1.4 (Table 7).

A total of 152 chinook carcasses were sampled on the middle fork of the Chulitna River. The fish had a mean length and standard deviation of 87.7, \pm 14.03 cm. The sex ratio of males to females was 1.1:1; males averaged 85.4 cm, while females averaged 90.1 cm in length. Age composition indicated 19.7% were Age 1.2, 46.7% Age 1.3 and 33.6% were Age 1.4 (Table 8).

In Willow Creek a sample of 131 chinook carcasses had a mean length and standard deviation of 104.1, \pm 15.46 cm. Males averaged 105.7 in length

Table 5. Total Chinook Escapement in East Side Susitna River Tributaries and Tributaries of the Chulitna and Talkeetna Rivers, 1972-1978.

<u>Year</u>	<u>Observed Counts</u>	<u>Expanded Counts</u>
1972*	1,775	2,300
1973	8,086	8,900
1974	3,556	4,100
1975	1,247	1,500
1976	16,753	19,900
1977	14,199	17,028
1978	12,853	15,365

* Does not include Prairie Creek.

Table 6. Observed Chinook Escapement Counts, Upper Cook Inlet, 1970-1978.

Stream	Ground Surveys								
	1970	1971	1972	1973	1974	1975	1976	1977	1978
Willow Creek	640	165	370	1,074	402	177	1,660	1,065	1,166*
Upper Ceception Creek									495
Montana Creek	161	44	317	527	280	229	1,445	1,443	881*
Moose Creek	126	40	21	36	32	55	116	153	237
Prairie Creek				4,190	1,498	369	6,513	5,790	5,154
Troublesome Creek									192

Stream	Aerial Surveys**								
	1970	1971	1972	1973	1974	1975	1976	1977	1978
Chunilna Creek	58*	5*	91	(292)	(283)	(101)	(1,237)	769	(997)
Kashwitna River		1	31	(183)	103	(33)	(203)	(336)	(362)
(North Fork)									
Little Willow Creek	45*		99	(371)	(139)	(103)	(833)	(598)	(436)
Sheep Creek			101	(482)	202	42	(455)	(630)	(1,209)
Indian River			35	(122)	102	31	537	393	114
Portage Creek			68	(174)	260	32	702	374	140
Chulitna River (East Fork)				(42)	41	7	112	168	59
Chulitna River (Middle Fork)				(219)	159	55	1,870	1,782	900
Chulitna River (Main Stem)							124	229	62
Prairie Creek	820	630		(3,286)					
Goose Creek					41	13	160	(133)	(283)
Little Susitna River				(374)			(405)		
Honolulu Creek							24	36	13
Byers Creek							53	69	
Troublesome Creek							92	95	
Bunco Creek							112	136	153

* Poor counting conditions.

** Helicopter surveys in parenthesis, all other aerial counts are fixed wing aircraft.

Table 7. Age and Length Data From Chinook Carcasses, Montana Creek, 1978.

Age	Female Length (cm)				Male Length (cm)				Total Combined Sexes			
	n	%	\bar{x}	\pm SD	n	%	\bar{x}	\pm SD	n	%	\bar{x}	\pm SD
1.2					29	29.3	66.5	5.36	29	16.7	66.5	5.36
1.3	10	13.3	93.1	1.85	22	22.2	89.6	6.12	32	18.4	88.8	5.91
1.4	65	86.7	104.8	3.52	48	48.5	116.6	7.70	113	64.9	109.8	8.15
Total	75	100.0	103.3	5.21	99	100.0	95.0	23.35	174	100.0	98.6	18.35

Table 8. Age and Length Data From Chinook Carcasses, Middle Fork Chulitna River, 1978.

Age	Female Length (cm)				Male Length (cm)				Total Combined Sexes			
	n	%	\bar{x}	\pm SD	n	%	\bar{x}	\pm SD	n	%	\bar{x}	\pm SD
1.2	1	1.4			29	37.2	65.5	4.81	30	19.7	65.6	4.73
1.3	51	68.9	86.2	5.15	20	25.6	87.3	4.48	71	46.7	86.5	4.97
1.4	22	29.7	100.2	2.91	29	37.2	104.0	6.53	51	33.6	102.4	5.57
Total	74	100.0	90.1	8.34	78	100.0	85.4	17.59	152	100.0	87.7	14.03

Table 9. Age and Length Data From Chinook Carcasses, Willow Creek, 1978.

Age	Female Length (cm)				Male Length (cm)				Total Combined Sexes			
	n	%	\bar{x}	\pm SD	n	%	\bar{x}	\pm SD	n	%	\bar{x}	\pm SD
1.2					11	16.7	65.7	4.54	11	8.4	65.7	4.54
1.3	9	13.9	89.7	3.32	4	6.1	86.3	5.12	13	9.9	88.6	4.07
1.4	56	86.1	104.6	4.98	51	77.2	115.8	7.75	107	81.7	109.9	8.54
Total	65	100.0	102.5	7.04	66	100.0	105.7	20.60	131	100.0	104.1	15.46

Table 10. Age and Length Data From Chinook Carcasses, Deception Creek*, 1978.

Age	Female Length (cm)				Male Length (cm)				Total Combined Sexes			
	n	%	\bar{x}	\pm SD	n	%	\bar{x}	\pm SD	n	%	\bar{x}	\pm SD
1.2					15	39.5	68.5	7.10	15	11.9	68.5	7.10
1.3	18	20.5	90.1	4.51	9	23.7	88.1	4.57	27	21.4	89.4	4.53
1.4	70	79.5	104.9	5.62	14	36.8	113.6	8.99	84	66.7	106.4	7.03
Total	88	100.0	101.9	8.08	38	100.0	89.0	21.79	126	100.0	98.0	14.88

and females and 102.5. The male to female sex ratio was 1:1. Age composition as determined by length frequencies indicated 8.4% were Age 1.2, 9.9% were Age 1.3 and 81.7% were Age 1.4 (Table 9).

A carcass sample was collected from Deception Creek to compare population characteristics with Willow Creek chinook. The 126 sample carcasses collected had a mean length and standard deviation of 98.0 +14.88 cm. Males and females averaged 89.0 and 101.9 cm, respectively, and the male to female sex ratio was 0.4:1. Age composition revealed 11.9% were Age 1.2, 21.4% Age 1.3 and 66.7% Age 1.4 (Table 10). The disparity in the sex ratio of Deception Creek chinook may primarily be due to the lateness of carcass recoveries. Males normally die earlier than females, so a late recovery would result in a larger number of recovered female carcasses. The sample also shows a larger percentage (33%) of Age 1.2 and 1.3 chinook than found in Willow Creek which had 18% in this age group. It is possible that due to the smaller size of Deception Creek that younger, smaller chinook utilize this system. Carcass recoveries will be continued to determine if there is a difference in age structure of Deception and Willow Creek chinook. Figure 2 depicts length frequency by percent of chinook carcasses collected in Montana Creek, Chulitna River and Willow Creek. Montana Creek chinook were very similar to those sampled in 1977 when 65% of the fish were Age 1.4 and the remainder were evenly divided between Age 1.2 and 1.3 chinook. Age composition of Chulitna River chinook has always been different from the Montana and Willow Creek kings with less 6-year-old fish represented in the sample. In 1978, for the first time, Age 1.3 chinook were dominant and 20% of the sample was Age 1.2 chinook. In Willow Creek there were larger numbers of Age 1.2 fish in 1978 than in the previous two years. Age 1.4 chinook still represented 81.7% of the sample in Willow Creek.

Coho Salmon Studies

Foot surveys were conducted in escapement index areas on six streams to estimate spawning coho salmon populations.

A summary of coho escapement counts in index areas is presented in Table 11. Index counts on Fish and Meadow creeks are no longer conducted because of the involvement of the Fisheries Rehabilitation and Enhancement Division in rehabilitation of the Big Lake Drainage.

Coho escapement levels were generally good in 1978. Wasilla Creek counts were lower than in 1975-76 but were above average since counts began in 1970. The 100 coho counted in Cottonwood Creek index area was identical to the record count in 1976. An additional 164 coho were observed in several other spawning areas interspersed between various lakes in the drainage. This is the highest number of coho observed in the Cottonwood Creek drainage since counts were initiated in 1968. Birch and Rabideaux creeks had average escapement levels while Question Creek escapement was lower than average.

A weir was operated in 1978 on Fish Creek by the Fisheries Rehabilitation and Enhancement Division. A weir has been on this stream since 1969 and

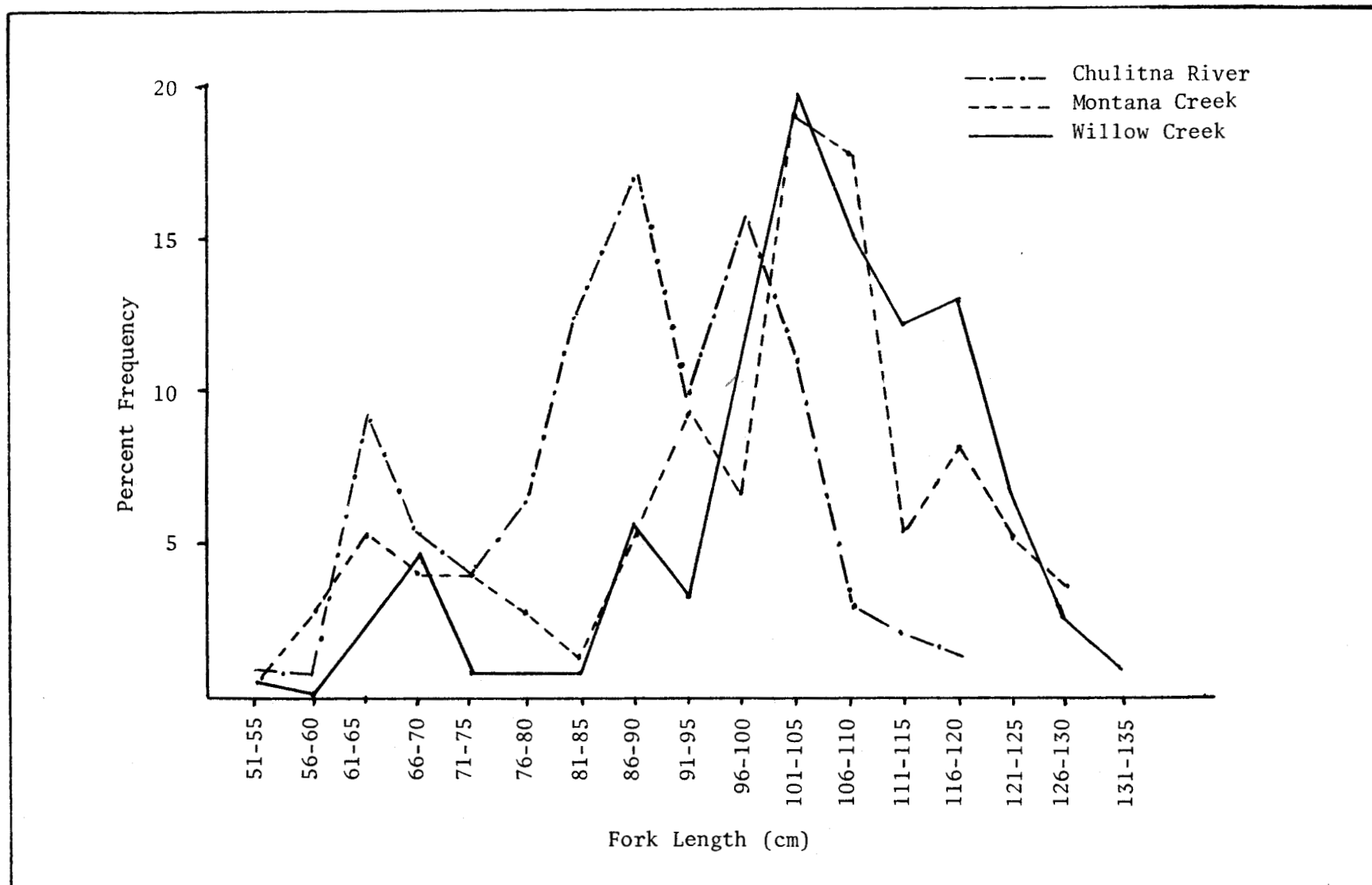


Fig. 2. Length frequency by percent of chinook salmon carcasses, Montana Creek, Chulitna River and Willow Creek, 1978.

Table 11. Number of Coho in Escapement Index Areas (foot counts), Upper Cook Inlet, 1968-1978.

Stream	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977*	1978
Wasilla (a)			101	104	19	28	30	49	151		74
Wasilla (b)			94					158	162		76
Cottonwood	22	9	5	29	21	10	2	73	100	25	100
Birch	125	142	206	138	69	106	49	92	27	96	103
Question						59	3	111	126	87	45
Rabideux								67	91		88
Total	147	151	406	271	109	203	84	550	657	208	486

* High water conditions prevailed making some escapement counts impossible.

Table 12. Adult Coho Salmon Escapement Counts, Fish Creek, 1969-1978.

Year	Dates of Operation	Weir Counts
1969	July 31 - September 2	4,253
1970	July 19 - August 8*	1,048
1971	July 8 - August 7*	583
1972	July 2 - September 10	716
1973	July 1 - September 6	210
1974	July 8 - September 6	1,154
1975	July 3 - September 11	1,601
1976	July 5 - September 11	765
1977	July 6 - August 15*	930
1978	July 7 - September 30	3,121

* Weir was not operated long enough to enumerate the entire coho escapement.

has been operated by both Commercial Fish Division and Sport Fish Division personnel in past years. The 1978 coho salmon escapement was the second highest recorded since 1969 (Table 12). The 3,121 coho counted through the weir in 1978 are primarily offspring from a 1974 escapement of 1,154 coho.

Considerable physical and chemical data were collected during the past year from numerous lakes and streams. Data include periodic stream flows, continuous thermograph readings from anadromous fish streams, and dissolved oxygen levels in numerous lakes throughout the Matanuska Valley. These data are available in the Alaska Department of Fish and Game files in the Palmer area office.

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